Amendments to the Claims

Please amend Claims 1, 7, 35 and 40. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently amended) A protein lattice having a regular structure with a repeating unit repeating in three dimensions,

the repeating unit comprising protein protomers, wherein each protein protomer comprises at least a first monomer and a second monomer genetically fused together or chemically fused together by a covalent linkage, the monomers each being a monomer of an oligomer assembly into which the monomers are assembled for assembly of the protomers into the lattice, and

wherein said first monomer is a monomer of a first oligomer assembly which has at least three rotational symmetry axes; and

wherein said second monomer is a monomer of a second oligomer assembly, said second oligomer assembly having a rotational symmetry axis of the same order as one of the at least three rotational symmetry axes of the first oligomer assembly and being aligned with the one of the at least three rotational symmetry axes of the first oligomer assembly when said protomers self-assemble into the lattice.

2-4. (Canceled)

5. (Previously presented) The protein lattice according to claim 1, wherein the orders of the rotational symmetry axes of said at least three rotational symmetry axes are independently selected from the group consisting of 2, 3, 4 and 6.

6. (Canceled)

7. (Currently amended) The protein lattice according to claim 1, wherein, in said protomers, said monomers are genetically fused via a linking group.

8. (Previously presented) The protein lattice according to claim 7, wherein the linking group fuses the first and second monomers in the protomer at each monomer's terminus to reduce deformation of the monomers and facilitate said alignment of the rotational symmetry axes.

9. (Previously presented) The protein lattice according to claim 1, wherein the protomers are homologous, all protomers in the protein lattice having the same set of monomers.

10. (Previously presented) The protein lattice according to claim 9, wherein said first oligomer assembly belongs to either a tetrahedral point group or an octahedral point group.

11. (Previously presented) The protein lattice according to claim 10, wherein said second oligomer assembly belongs to a dihedral point group of the same order as the one of said set of rotational symmetry axes of said first oligomer assembly.

12. (Previously presented) The protein lattice according to claim 10, wherein said second oligomer assembly belongs to either a tetrahedral point group or an octahedral point group.

13. (Previously presented) The protein lattice according to claim 9, wherein said first oligomer assembly belongs to a dihedral point group of order 3, 4, or 6, and said protomers comprise at least two second monomers with a second monomer fused to each terminus of said first monomer of said first oligomer assembly.

14. (Previously presented) The protein lattice according to claim 13, wherein one of said second monomers is a monomer of an oligomer assembly which belongs to a dihedral point group of the same order as the dihedral point group to which the first oligomer assembly belongs.

15. (Previously presented) The protein lattice according to claim 14, wherein the other of said second monomers is a monomer of an oligomer assembly which belongs to a dihedral point group of order 2.

16. (Previously presented) The protein lattice according to claim 1, wherein the protomers are heterologous, comprising at least two different types of protomers in the protein lattice.

17. (Previously presented) The protein lattice according to claim 16, wherein the repeating unit comprises protomers of two types, a first type of protomer and a second type of protomer, and wherein each of the two types of protomers has: (1) one monomer selected from a homologous oligomer assembly consisting of the same type of monomers; and (2) one monomer selected from a heterologous oligomer assembly consisting of two different types of monomers.

18. (Previously presented) The protein lattice according to claim 17, wherein said first type of protomer in the repeating unit has a first monomer being assembled into said first oligomer assembly that is homologous and said first monomer of the first type of protomer fused to a second monomer which is one of said two different types of monomers of the heterologous oligomer assembly, and wherein said second type of protomer has a first monomer being assembled into a third oligomer assembly that is homologous and said first monomer of the second type of promoter is fused to a second monomer in the second type of protomer, said second monomer in the second type of protomer being the other of the two different types of monomers of said heterologous oligomer assembly.

19. (Previously presented) The protein lattice according to claim 18, wherein said first oligomer assembly into which the first type of protomer assembles belongs to either a tetrahedral point group or an octahedral point group.

20. (Previously presented) The protein lattice according to claim 18, wherein said third oligomer assembly belongs to a dihedral, tetrahedral or octahedral point group of the same order as said heterologous oligomer assembly.

21. (Previously presented) The protein lattice according to claim 18, wherein said heterologous oligomer assembly belongs to a cyclic point group, wherein one of the rotational symmetry axes of said heterologous oligomer assembly is aligned with the rotational symmetry axes of the first and third oligomer assemblies.

22. (Previously presented) The protein lattice according to claim 1 having an array of macromolecular entities attached thereto.

23. (Previously presented) The protein lattice according to claim 22, wherein the protomers have, at a predetermined position in the protomers, an affinity tag attached to a macromolecular entity.

24. (Previously presented) The protein lattice according to claim 22, wherein the macromolecular entities have a peptide affinity tag attached to one of the protomers in the protein lattice.

25. (Withdrawn) A method of supporting macromolecular entities for x-ray crystallography comprising: 1) providing a protein lattice according to claim 1 as a support; 2) placing an array of macromolecular entities into a protein lattice according to claim 1; and 3) performing x-ray crystallography of the macromolecular entities.

26. (Withdrawn) A method of performing x-ray crystallography comprising supporting an array of macromolecular entities on a protein lattice according to claim 1 and performing x-ray crystallography on the lattice having the macromolecular entities supported thereon.

27. (Withdrawn) A protein protomer comprising at least two monomers fused together, the monomers each being monomers of a respective oligomer assembly into which the monomers are capable of self-assembly to assemble at least part of a repeating unit of a protein lattice having a regular structure repeating in three dimensions, wherein, in said protomer, at least a first monomer is a monomer of a first oligomer assembly which has a set of rotational symmetry axes extending in three dimensions, and at least a further monomer fused to said first monomer is a monomer of a further oligomer assembly, each further oligomer assembly having a rotational symmetry axis of the same order as one of the set of rotational symmetry axes of the first oligomer assembly and being aligned with the one of the set of rotational symmetry axes of the first oligomer assembly.

28. (Canceled)

29. (Withdrawn) Plural different protein protomers according to claim 27, wherein the monomers of the plural different protomers are capable of self-assembly with each other to form the entire protein lattice.

30. (Withdrawn) A polynucleotide encoding a protein protomer according to claim 27.

31. (Withdrawn) A vector capable of expressing a protomer according to claim 27.

32. (Withdrawn) A host cell comprising a vector according to claim 31.

33. (Withdrawn) A method of making a protein protomer according to claim 27, comprising expressing a polynucleotide sequence which encodes the protomer in a host cell and, optionally, purifying the expressed protomer.

34. (Canceled)

35. (Currently amended) The protein lattice according to claim 9, wherein said first oligomer assembly and said second oligomer assembly have a rotational symmetry axis of order four (4) and are independently selected from the group consisting of human ferritin heavy chain, *Escherichia coli* (*E. coli*) ~~dihydrolipoaminde~~ dihydrolipoamide succinyltransferase, *Azotobacter vinelandii* dihydrolipoamide acetyltransferase, *E. coli* PurE and Sipunculid worm hemerythrin.

36. (Withdrawn) The protein lattice according to claim 35, wherein said first oligomer assembly is *Escherichia coli* PurE and said second oligomer assembly is human ferritin heavy chain.

37. (Withdrawn) The protein lattice according to claim 9, wherein said first oligomer assembly and said second oligomer assembly have a rotational symmetry axis of order three (3) and are independently selected from the group consisting of human 6-pyruvoyl tetrahydropterin synthase (PTPS), rat 6-pyruvoyl tetrahydropterin synthase (PTPS), *Escherichia coli* dps, *Staphylococcus epidermis* EpiD and *Escherichia coli* amino acid aminotransferase.

38. (Withdrawn) The protein lattice according to claim 37, wherein said first oligomer assembly is Escherichia *coli* dps and said second oligomer assembly is human PTPS.

39. (Withdrawn) The protein lattice according to claim 9, wherein said first oligomer assembly and said second oligomer assembly have a rotational symmetry axis of order two (2) and are independently selected from the group consisting of human Mn superoxide dismutase and *Plasmodium falciparum* lactate dehydrogenase.

40. (Currently amended) The protein lattice according to claim 21, wherein said first homologous oligomer assembly and said third homologous oligomer assembly have a rotational symmetry axis of order four (4) and independently selected from the group

consisting of human ferritin heavy chain, *Escherichia coli* (*E. coli*) ~~dihydrolipoaminde~~ dihydrolipoamide succinyltransferase, *Azotobacter vinelandii* dihydrolipoamide acetyltransferase, *E. coli* PurE and Sipunculid worm hemerythrin; and wherein said heterologous assembly is Erachiopod hemerythrin.

41. (Withdrawn) The protein lattice according to claim 21, wherein said first homologous oligomer assembly and said third homologous oligomer assembly have a rotational symmetry axis of order two (2) and are independently selected from the group consisting of human Mn superoxide dismutase and lactate dehydrogenase; and wherein said heterologous assembly contains human casein kinase alpha and beta chains

42. (Withdrawn) The protein lattice according to claim 21, wherein said heterologous assembly has a rotational symmetry axis of order three (3) and is selected from the group consisting of:

i. Coliphate T4 gp5 gp27;

ii. human immunovirus N36 C34; and

iii. *Pseudomonas putida* napthalene 1,2-dioxygenase, and

wherein said first oligomer assembly and said third homologous oligomer assembly have a rotational symmetry axis of order three (3) and are independently selected from the group consisting of:

i. human 6-pyruvoyl tetrahydropterin synthase (PTPS);

ii. rat 6-pyruvoyl tetrahydropterin synthase;

iii. *Escherichia coli* dps;

iv. *Staphylococcus epidermis* EpiD; and

v. *Escherichia coli* amino acid aminotransferase.